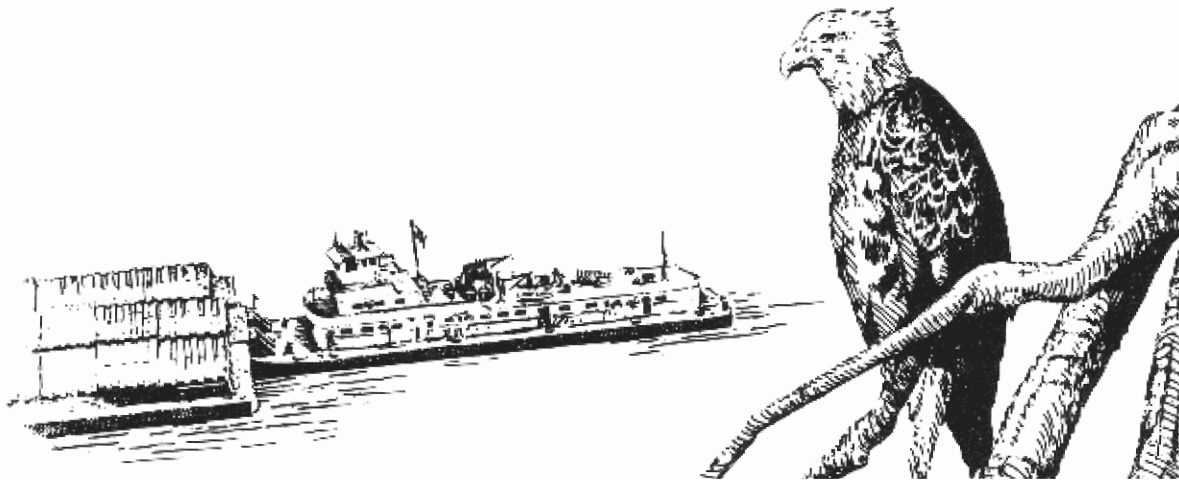


Chapter 7

River Tinkerers



One of the perennial figures in American folklore is the tinkerer, that small-time inventor who turns bits of junk into strange but workable machines that fly or kill mice or get other jobs done. Most tinkerers are never famous beyond their own yard; others, like the Wright brothers in their bicycle shop, have tinkered their way into history.

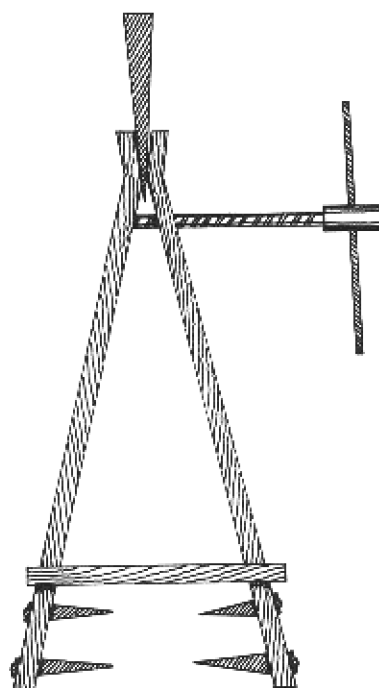
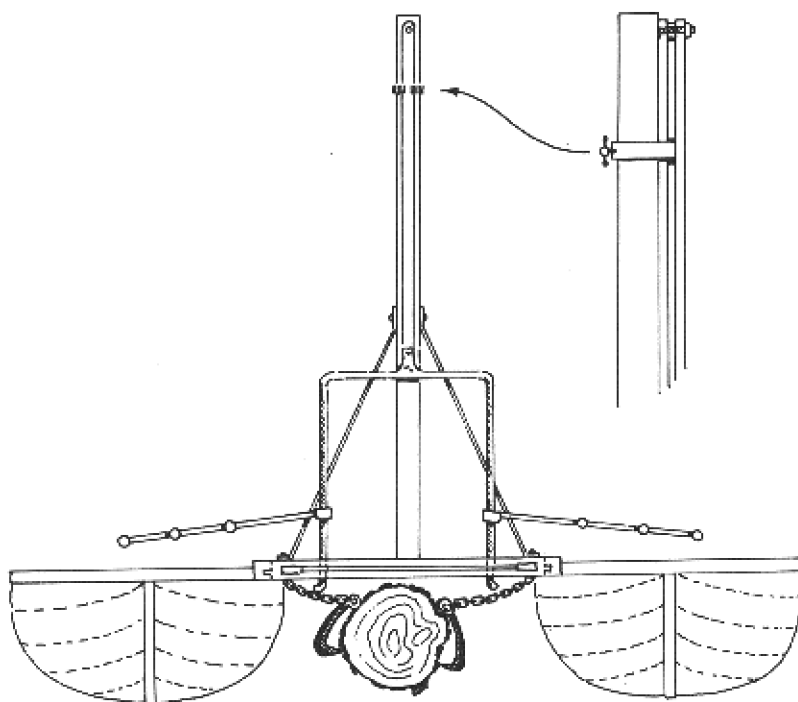
In the history of American tinkering, no group is more typical than the many rivermen who addressed themselves to navigation improvement. A very few, such as Henry Shreve, were successful. His high pressure engine designs helped conquer the Mississippi, and his snagboats made steamboat travel safer. Most tinkerers, however, lacked Shreve's imagination, and because every Mississippi pilot and riverman considered himself an expert on the topic of river improvement, the engineers of the Rock Island District constantly found themselves amused and often plagued by individuals and groups who knew how to improve the channel with less work and more economy than the Corps of Engineers.

Even before the beginning of the Rock Island District, river tinkers; were at work. In 1824, the Board of Engineers appointed as a result of the General Survey Act to determine the most suitable methods of improving the Ohio and Mississippi Rivers, placed an advertisement in newspapers throughout the United States offering a reward of \$1,000 for "the plan, machines, or instrument best calculated to remove sawyers, planters, and snags in the Mississippi River, so as to render the navigation free and safe."¹

This single advertisement, placed by Chief of Engineers Major General Alexander Macomb, drew many responses, some of which were incorporated into later river work. The responses ranged from simple solutions such as blowing the snags to pieces with black powder² to complicated equipment such as that suggested by T.W. Parker. Parker proposed a diving bell in which to send a crew down to saw up the snags underwater, and a steamboat with a screw in the middle, run by horses on a round treadmill to run the screw into the piece of snag and pull it free of the bottom.³ E. Blunt of New York sent in plans for a "parachute," a large sail cloth umbrella which could be tied to the snag, then opened downstream so that the current could pull the snag free.⁴

The most common suggestion involved some variation on a twin-hulled boat similar, as one respondent said, "to the Twin Ferry-boats on the River Hudson."⁵ Some designs placed a winch between the two hulls to lift the snag out; others suspended elaborate underwater circular saws from the hulls to saw the snag up.⁶ Benjamin Tucker sent plans for a watertight periscope to find the snags, and plans for "a dress made of caoutchouc [crude rubber] with glass set in over the eyes."⁷ Two men wearing these diving suits would stand on the bottom of the river and saw the snags up with a two-man saw, breathing through tubes made of spiral wire covered with gum which ascended to a flatboat on the surface.

Other letters sent to the Board contained suggestions for handling sandbars and shoal water. W.



Wright submitted **drawings** of his "mud tortel," a scoop for "remooveing the **sand and gravel and arth offaney Bar** or Shoel or island shutes in the River of Ohio and Mississippi [sic].⁷ A. Read proposed a **gang** of three plows hitched together to plow out **bars**, followed by a large scoop to catch the loose mud.⁸ Many proposed variations of wing dams. John Baxter suggested filling flatboats with stone until **they sank**, then planking them **over**. To **mask** the resulting channel, he proposed **putting** bells at the edge of the channel, rung by the motion of the water through a wheel, with one side of the channel **ringing** twice the **rate** of the other.⁹ Baxter also **proposed** a boat that would not only pick up **snags**, but would saw up the wood and sell it to passing steamboats for firewood.¹⁰ Henry Vose suggested a **kind** of movable wing dam consisting of a huge raft 300 by 250 feet which would be purposely stuck on a **sandbar** so that the river would be forced around the raft and wash away the **bar**.¹¹

A number of the respondents offered to **undertake** the **whole job** of **river improvement** off Government hands and do it themselves. T.W. Parker offered to clear the 400 miles of Mississippi **from the mouth of** the Ohio down to the Louisiana state **line** of snags and other obstructions **for \$100 per mile**.¹² John Bruce made a lump bid of \$60,000 for clearing all of the Ohio **from Pittsburgh** to the Mississippi and the Mississippi **from the Missouri River** to New Orleans.¹³

There was also one suggestion among the respondents to the advertisement that the cost of **removing** obstructions be raised by a **toll on steamboats** using the waterway, an **idea** that was not to **become** a reality for more **than** 150 years. Edward Clark suggested that the amount of **such** a toll be decided by "the **aggregate of property which is lost or injured** in consequence of these impediments to navigation in the present condition of the river."]'

During the remainder of the **improvement work**, such river tinkerers were at hand, **giving** advice free or offering to sell it to the Corps of Engineers. Lee, Long, Wilson, and their assistants all gct such advice,

When Major G.K. Warren investigated the possible methods of clearing the channel in 1866-67, he was flooded with suggestions, several of which he mentioned in his report.¹⁶ There was the plan of **E.E. Bishop of New Orleans, whose** idea was to "fix two large screws obliquely, one on each side of a steamboat's bow; these, driven by the engine, draw the boat through the water, and on striking a sandbar, throw the material on each side, making a way through it equal to their greatest width apart."¹⁶

A similar plan was suggested by **Colonel William R. Noble of St. Paul.** His invention provided "for an arrangement of two endless screws, placed on a horizontal axis at the end of the boat, and arranged to lower to the sand. The screws, driven by steam, are made to stir up the sand, and push it each way outward."¹⁷

Another plan Warren came across was by a **Mr. Jones** who, obviously influenced by adjacent farmlands, devised a plan "to drag a large plough over the bar by attaching it to the stern of a steamboat."¹⁸

Captain Edwin **Bell**, an old and respected riverman, suggested to Warren the first of what was to become a long series of inventions he proposed to the Corps, a wheel with teeth in it suspended between two boats and turned by the power of the river current. This action would be aided by scows which would lower boards along their sides to act as wing dams in channeling the current. The teeth of the wheel would churn up the sand and the current would carry it off.

Bell was regarded as something of an eccentric, though his knowledge of the river was respected. He was a steamboat captain from 1854 to 1867, when Warren hired him to supervise removal of snags on the Minnesota River. Bell convinced Warren that "sand dams" could be created to constrict a channel by lowering boards to within four inches of the bottom. The current sweeping under these board walls would scour out sand and deposit it further downstream as a dam. This would do away with the need

to build **wing dams of brush and stone**. Warren authorized **Bell** to test **this** invention on the Wisconsin River in 1869, and **paid \$400 for it**. It became part of the **equipment** transferred to Colonel **Macomb** in 1870.

In the 1870's and 1880's, however, **Bell's** relationship **with** the Corps grew increasingly strained. The Corps rejected a long string of **Bell** devices, and in turn **was accused** by Bell of using his **ideas** without paying royalties.

A long correspondence covering the tenure of several District Engineers developed **over** Bell's movable wing dams, which consisted of a string of barges with wooden gates along one edge. The gates were to be lowered to the **bottom** of the river, forming a **wall** to direct the **current**. After that section of **channel** had been improved, the dam could be moved to another location. Colonel **Macomb** ran tests on the wing dam flats in **August** 1876, and convened a Board of Engineers to investigate its merits, but no action was **taken**.

The Corps **paid somewhat** more attention to **Bell's** contraption for building **dams, which** he invented after the Corps had committed itself to wing dams as the method of obtaining the 4½-foot channel. This **was** essentially a barge tilted so that one side was beneath the water, **making** it easier to position material along the dam. **Major** Farquhar requested permission to build **and test** one of these in 1878.¹⁹

Captain **Bell's** final **attempt** to help the Corps **came** in 1895 when he developed a method of **removing** sand **from** the channel and depositing it in between the wing **dam**3 that **had been** built. **This would form** new banks further out in the river so as to **"make a canal in the channel."**²⁰

The **most** unusual inventor ever to have **anything** to **do** with We Rock Island District was a man by the name of **Adams** who, in some manner, convinced Congress in 1879 that **his** invention, the "Adams Flume," could quickly clear the whole channel from St. Paul to St. Louis for a fraction of the proposed

cost of the Engineers' plans. Congress appropriated \$20,000 for Adams' experiments and instructed the Rock Island District to give him a test section of the river. Additional appropriations; of \$8,000 in 1882 and \$15,000 in 1886 brought the total to \$43,000. By 1886, however, Congress was beginning to listen to the reports of Colonel Mackenzie, and in 1887 the Secretary of War suspended Adams' work. The River and Harbor Bill of 1892 gave Adams a final \$5,000 to give up all claims.

Colonel Mackenzie investigated the remains of the Adams Flume in 1892 at the request of the Secretary of War. He found a few sections of pipe, some sheet iron, and a 5-horsepower pump. No section of Adams' pipe had ever been in the river; apparently, Adams had never gotten around to actually testing his invention.

Adams was never very clear as to just how his flume worked. He showed it to Major Farquhar in 1877 (who tried to convince him it would never work). Basically, it consisted of a triangular pipe laid down the middle of the channel. The pipe had rows of small E-shaped jets. Adams proposed to pump water through the pips under pressure. The water coming out of the jets would stir up the mud, sand, or gravel, and the current would wash it away. In a letter to the chairman of the River and the Harbor Committee in 1886, Adams claimed that "to lay it in one unbroken line in the center of the river from its head to the Gulf Will scour a channel the necessary depth and width throughout and keep it open all through."²¹ Adams had counted on one small pump every 100 miles to power the operation.

Outsiders were not the only tinkerers on the Upper Mississippi. The Engineers themselves proved to be innovative in their development of methods and equipment to improve the river, Lee's drilling rigs at the Des Moines Rapids, the design of snagging and dredging equipment suited to the Upper Mississippi's sandy bottom, Wheeler's use of Portland cement on the Illinois and Mississippi Canal, and Farquhar's steam scows were all results of trial and error in the field.

Engineers like Montgomery Meigs were natural tinkerers. Meigs used the excess steam from the Des Moines Raids Canal lock operations to heat the Keokuk Engineer Office; he experimented with adapting garden squirts as boat pumps; and throughout his career with the Corps he tinkered with boats and engines. We was perhaps the only man to redesign a dredge hull "for just a bit more speed." One of Meigs' inventions used on many subsequent projects was a canvas coffer dam developed for the Des Moines Canal project. This permitted engineers working on locks to circumvent the normal crib cofferdam.

Another inventive assistant engineer in the Rock Island District was E.F. Hoffmann, who supervised the Rock Island Rapids improvement work. In 1868 Hoffmann perfected a model of a diving bell to be used for raising stone, but money for a full-sized model, though requested, was never appropriated. Hoffmann also developed a moveable cofferdam and a tamping machine for exploding mines and dynamite.

The most useful of Hoffmann's devices was a self-registering sounding machine developed in 1874 along the lines of the one developed a few years earlier for the Illinois River survey. This machine allowed a tremendous increase in the number of soundings a survey crew could make. The machine was installed on a barge and towed by a steamer. Its operation was described in the *Annual Report* for 1875:

The self registering sounding machine which is pushed by a small steamer and worked by the capstan of the boat, covers a width of 100 feet, upon which 10 sounding poles are fixed, which descend simultaneously and perpendicularly at option from one to six times per minute, so that from 10 to 60 soundings in that time can be made and recorded. In practice, 40 soundings per minute is the maximum, because the observers of theodolites on shore are unable to read with accuracy more than four bearings in a minute. The machine saves, when in use, 10 men with poles and 10 recorders, and the recording apparatus throws out very distinctly and accurately the profile of the river bed. The depth to which the poles descend is 14.5 feet. It could be increased to 20 feet in depth with attached pieces to the poles.²⁷

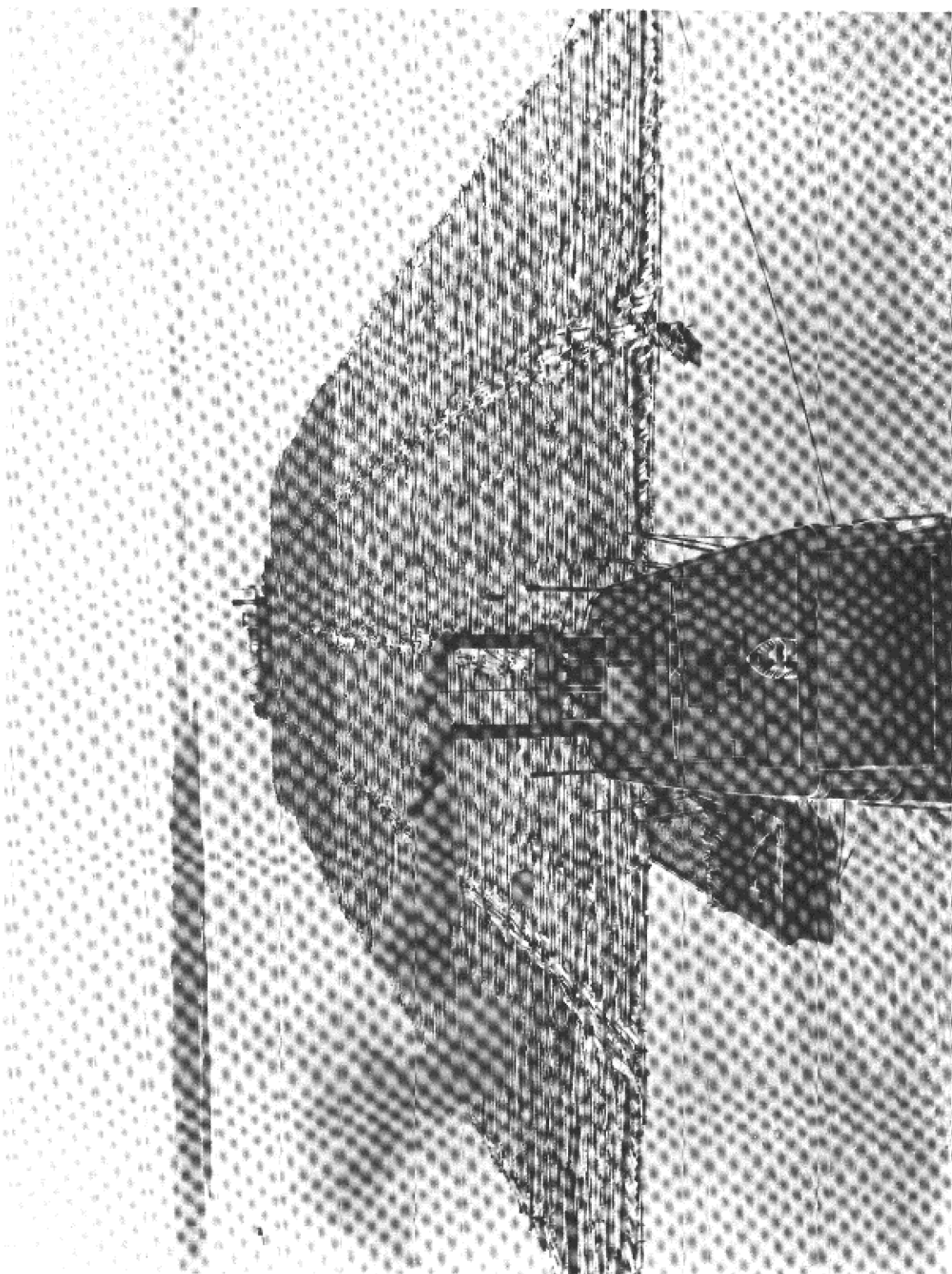
This machine became so much a part of the equipment in the District that it was eventually given a name, the *J. N. Macomb*.

Today, editorials and letters to the editors in newspapers along the Upper Mississippi show that tinkering has not disappeared. A sunken barge, a flood, an ice jam, and low water — all of these bring the tinkers out to advise the Corps on what to do; and just as before, the suggestions range from the carefully-thought-out plan to the listen-to-this-one variety. The Rock Island District still has its own tinkers, too. The Mississippi is always full of new tricks and will continue to require tinkering.

Notes

Chapter 7

1. "Plans for Removal of Obstructions From the Mississippi and Ohio Rivers," File 252, RG77, NA.
2. Letter of C.L. Rackwood to Secretary of War, August 13, 1824, File 252, RG77, NA.
3. T.W. Parker to Secretary of War, August 12, 1824, File 252, RG77, NA.
4. E. Blunt to John C. Calhoun, June 19, 1824, File 252, RG77, NA.
5. N. Hunt, no date, File 252, RG77, NA.
6. Allen Fitch, June 23, 1824, File 252, RG77, NA.
7. W. Wright, no date, File 252, RG77, NA.
8. A. Read to Secretary of War, August 29, 1824, File 252, RG77, NA.
9. John Baxter to Major General Alexander Macomb, June 10, 1824, File 252, RG77, NA.
10. *Ibid.*
11. Henry Vose to Secretary of War, September 8, 1824, File 252, RG77, NA.
12. T.W. Parker to Secretary of War, July 28, 1824, File 252, RG77, NA.
13. John Bruce to Secretary of War, August 31, 1824, File 252, RG77, NA.
14. Edward Clark to Secretary of War, August 16, 1824, File 252, RG77, NA.
15. U.S. Congress, House, *Letter from the Secretary of War in Answer to a Resolution of the House, of December 20, 1866, Transmitting Report of the Chief of Engineers, with General Warren's Report of the Surveys of the Upper Mississippi River and Its Tributaries*, Executive Doc. 58, 39th Congress, 2d Session, 1867.
16. *Ibid.*, p. 27.
17. *Ibid.*
18. *Ibid.*
19. Major F.U. Farquhar to Chief of Engineers, August 6, 1878, File 71, Letters Received, RG77, NA.
20. J.D. DuShane to Colonel W.R. King, August 22, 1895, File 1652, Vol. 6, Press Copies of Letters Sent, RG77, NA.
21. *Annual Report*, 1888, III, p. 1512.
22. *Annual Report*, 1875, I, p. 466.



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